ON SOME ACARINA FROM AUSTRALIA AND NEW GUINEA PARAPHAGIC UPON MILLIPEDES AND COCKROACHES, AND ON BEETLES OF THE FAMILY PASSALIDAE.

by H. WOMERSLEY
South Australian Museum

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SUMMARY

This paper is the first of a series dealing with certain families of Trigynaspida-Mesostigmata (Acarina) paraphagic upon millipedes, cockroaches and Passalid beetles from Australia and New Guinea. This part deals with the family Diplogyniidae and six species belonging to five genera are described. The genera *Monodiplogynium* with type *M. carabi* sp. nov. and *Paradiplogynium* with type *P. panesthia* sp. nov. are new. Two new species of *Cryptometasternum*, *queenslandense*, and *derricki*, *Diplogyniella gayi* and *Passalacarus brooksi* are described for the first time. A revised key to the genera of the subfamily Diplogyniinae is given.

Pt. 1.—The family DIPLOGYNIIDAE.

(Mesostigmata, Trigynaspida.)

Diplogyniidae Trägårdh, 1941, Ent. Tidsk., **62** (3-4), p. 176.

Type genus and species *Diplogynium acuminatum* G. Canest, 1889.

This paper is the first of a series dealing with the description and recording of some Acarina from Australia and New Guinea which are paraphagic in habit upon various millipedes and cockroaches, and on the body and under the elytra of beetles belonging to the family Passalidae.

These mites belong to a number of families of the Mesostigmata, namely, Laelaptidae and Diarthrophallidae of the Monogynaspidae and Celaenopsidae, Diplogyniidae, Fedrizziidae and Megisthanidae of the Trigynaspida, while other small forms mainly found under the elytra of the beetles belong to the Canestriniidae of the Sarcoptiformes.

This part of the series deals with the family Diplogyniidae and six species belonging to five genera are described for the first time. Two of the genera are new.

Of the two new genera *Paradiplogynium* and *Monodiplogynium* described in the present paper, the first might possibly be placed in Trägårdh's subfamily Neodiplogyniinae, rather than the Diplogyniinae on the fact that the anal shield in the female although embraced within and fused with the ventral is clearly defined by a line. It is, however, of an entirely different shape from the anal shield in *Neodiplogynium* which is triangular in shape and separated from the ventral shield by a distinct transverse suture. Of the six species described *Cryptometasternum queenslandense* sp. nov. is from millipedes and *C. derricki* sp. nov., *Passalacarus brooksi* sp. nov and ? *Diplogyniella gayi* sp. nov. are from beetles of the family Passalidae, *Monodiplogynium carabi* sp. nov. is from a small Carabid beetle (?Fam.) and *Paradiplogynium panesthia* from a cockroach, *Panesthia laevicollis* Sauss.

Genus CRYPTOMETASTERNUM Trägårdh, 1950

Trägårdh, I., 1950, Arkiv. F. Zool., Ser. 2. 1 (25), p. 363.

Type *C. natalense* Trägårdh, 1950.

Trägårdh erected this genus for a species which he collected in Natal from "under the bark of a dead tree" in 1905. While most if not all species of mites of the family Diplogyniidae are paraphagic in habit on millipedes or beetles of the family Passalidae, it is unfortunate that Trägårdh gives no indication of a possible host of his species.

The original diagnosis of the genus reads as follows:—

"Shape oval, dorsal side covered by a single shield which leaves unprotected a narrow strip from the shoulders backwards. The margin is covered by a narrow marginal shield.

"Male sternal shield with narrow transverse free, horizontal blade which covers the genital aperture. Female sternal shield with a similar blade. Metasternal shields separate, very narrow, only two small areas carrying the hairs and pores being visible between the sternal and lateral shields without dissection. Lateral shields triangular, with short anterior lobes and the straight median sides contiguous except where the small triangular epigynial shield is situated.

"Ventral shield fused with the anal shield, almost reaching the posterior margin of the body. The ventri-anal shield is fused with the ectopodial shields forming a large triangular shield separated from the marginal shields by a very narrow streak of soft cuticle which curves at an acute angle backwards a little behind the shoulders, not quite reaching the margin of the body. Legs I slender, antennaeform."

Other characters of generic importance not included in the above diagnosis, but used by Trägårdh in his key to the genera of the subfamily Diplogyniinae (loc. cit. p. 450) are:—

1. The number of setae on the lateral shields (two in *Cryptometasternum*);
2. the position of the third pair of sternal setae (close together near apex of posterior sternal margin in *Cryptometasternum*),
3. the length of the metasternal setae (short in *Cryptometasternum*);
4. the length of the anterior lobes of the lateral shields (short in *Cryptometasternum*).

A revised diagnosis embracing the above features but using the nomenclature for the genital shields proposed by Camin and Gorirossi, 1955 (A Revision of the Suborder Mesostigmata (Acarina) based on New Interpretations of Comparative Morphological Data—Chicago Acad. Sci., Special Publ. Eleven) may be as follows:—

"Oval, well chitinised mites with an entire dorsal shield covering almost the whole body except for a narrow strip of cuticle between it and the marginal shields, with long thin tapering setae and numerous pores, the front of the idiosoma has a pair of long setae set wide apart and medially of these set slightly backwards is a single long seta. Legs I slender, as long as or longer than the body, antennaeform, without caruncle or claws; legs II-IV stouter, with short caruncle and paired claws. Stigma situated between coxae II and IV with long thin peritreme. In both sexes the sternal shield with horizontal anterior blade overlapping base of tritosternum and in the male also the genital orifice. In the female the sternal shield is wider than long with more or less deeply concave posterior margin, with three pairs of setae and two pairs of lyriform pores, the first pair of setae are long and wide apart and set at the anterior angles, the second pair are slightly nearer together, long and about in line with the front edge of coxae II, the third pair are also long, and set close together near the apex of the posterior margin; the metasternal shields are long and narrow, horizontal, and lie between and more or less hidden beneath the posterior margin of the sternal and anterior margin of the latigynial shields, with a short seta and round pore near the outer ends; latigynial shields large, triangular, anterior margin with rather short lobes, inner margins straight and contiguous for most of their length only diverging posteriorly to surround the small triangular mesogynial shield, each shield with two long setae; genital or mesogynial shield small and triangular and separated from the ventral shield by a narrow suture; ventral and anal shields coalesced to form a long triangular shield with inwardly curved sides and reaching almost to the posterior margin, the sides are narrowly separated from the latero-ventral shields by a narrow strip of cuticle; chelicerae strong with many teeth, the basal tooth on the movable digit being very strong, movable digit with ciliated processes. In the male, similar ventrally to the female, except that the sternal, metasternal, ventral and anal shields form a single holoventral shield with the genital orifice under the anterior blade, the first, second and third setae on sternum as in the female, but third are as wide apart as the first and second, the metasternal setae are much shorter and with their small circular pore lie in the angle of the shield between coxae II and III; the chelicerae are much as in the female, but the fixed digit has a strong curved and somewhat twisted spermatophore carrier."

Type *C. natalense* Trägårdh.

The following two new species of *Cryptometasternum* are now described from Australia as paraphages of millipedes and of beetles of the family Passalidae.

Cryptometasternum queenslandense sp. nov.

Text fig. 1, A-H

Female holotype—Shape oval, posterior end rounded. Strongly chitinised and dark brown in colour. Length of idiosoma 940μ, width 684μ.

Dorsum—Shield almost entirely covering body, except for the narrow strip of cuticle separating it from the marginal shields, anteriorly the shield has two long setae wide apart and to 103μ long and on each side of these a shorter seta, in between the long pair and set slightly further back is a single long seta, otherwise the dorsal shield has ca. twenty pairs of long setae, the posterior pair only slightly shorter than the anterior long pair, and the others somewhat shorter; marginal shields with about seven or eight setae on each side; dorsal shield with an indefinite number of pores.

Venter—Tritosternum with ciliated base more or less hidden under the anterior blade of the sternal shield, with a pair of ciliated laciniae; sternal shield wider than long, its anterior margin concave and posterior margin more so, length in median line 75μ and width between postero-lateral angles 330μ, with three pairs of sternal setae and two pairs of pores, sternal setae I placed in the anterior angles wide apart and directed forwards 42μ long, II almost directly behind and 47μ long, III close together, only 19μ apart; metasternal shields long and narrow lying inclined forwards to the middle and partially hidden by the overlap of the latigynial shield; latigynial shields large and triangular, anterior margins with fairly long lobes, inner margins contiguous only diverging at about the posterior fourth to surround the small triangular mesogynial shield, with two setae 25μ long and 60μ apart close to the outer margins and equidistant from each end, with the usual claviform sclerites; mesogynial shield small and triangular and separated from the ventral shield by a narrow suture; ventral and anal shields coalesced to form a long triangular shield with incurved margins almost reaching tip of body and separated from the latero-ventral shields by a narrow suture, with six pairs of setae the posterior pair being slightly behind the anus. Peritreme long and narrow with stigma placed between coxae III and IV, and the peritremal and exopodal shields coalesced.

Gnathosoma—Tectum mostly a pointed cone, but occasionally with apex cut off and indented as in the male (see Fig. 1, D, H and E); mandibles as figured with many teeth on the chelicerae, the movable digit with the basal tooth large and prominent, and with long ciliated processes, *pilus basalis* small but conspicuous; the hypostome with strong labial cornicles, the median lobes fringed and bearing two long, tapering appendages, with four pairs of hypostomal setae.

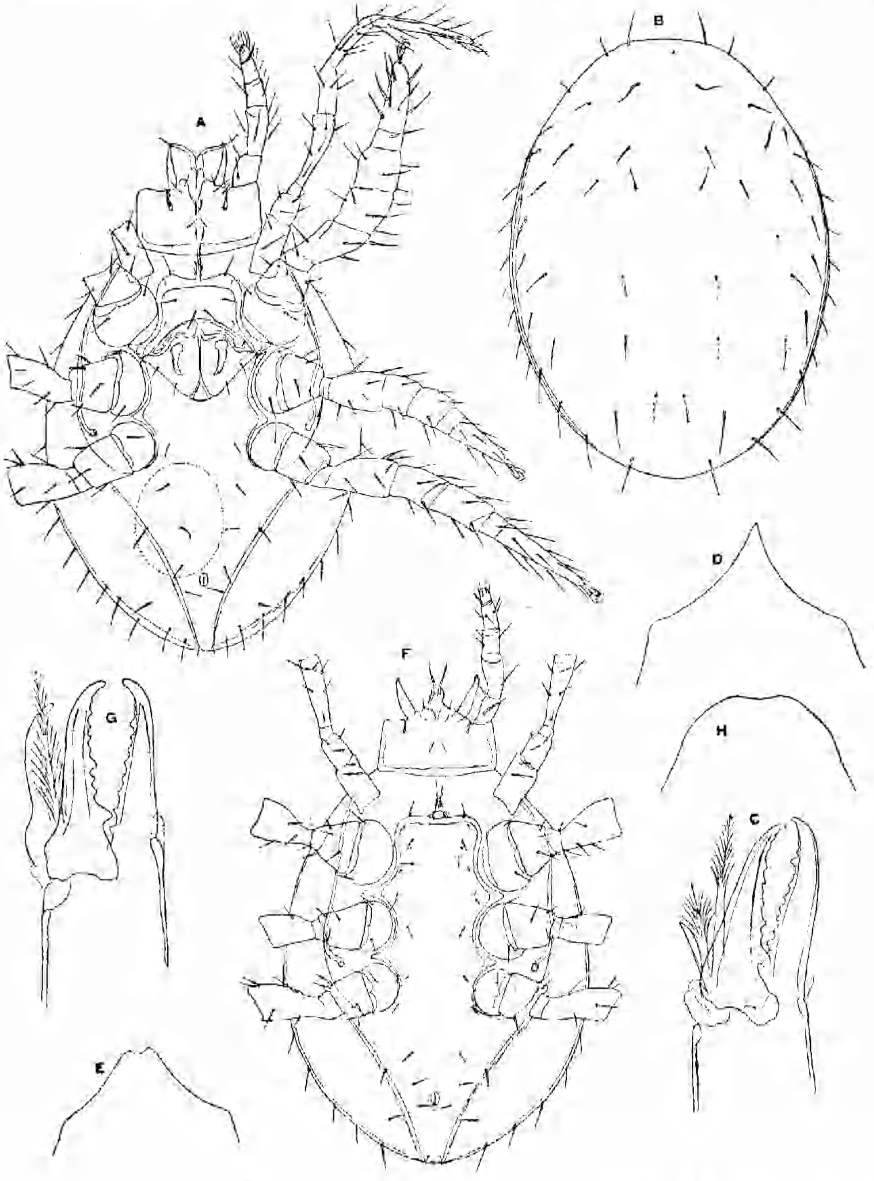

Fig. 1.—*Cryptometasternum queenslandense* sp. nov. A-E female. A, venter; B, dorsum; C, chelicerae; D, tectum; E, same of a variety from Tambourine; F-H male, F, venter; G, chelicerae; H, tectum.

Legs—I not longer than body, 880μ, antennaeform, without caruncle or claws; II slightly the stoutest of the rest, 812μ, without any special armature, with short caruncle and paired claws; III 812μ and similar to II; IV similar but to 870μ long, no especially strong spines on coxae.

Male Allotype—Length of idiosoma 905μ, width 638μ, facies as in female.

Dorsum—As in female.

Venter—Sternal, metasternal, latigynial, ventral and anal shields all coalesced to form a single holoventral shield with the base of the tritosternum and the genital orifice hidden under the anterior blade, with ten pairs of setae as figured, the first pair of sternal setae at the anterior angles and directed forwards, the second pair almost directly behind the first, the third pair almost as wide apart as the second and in a line with the middle of coxae II, the fourth pair corresponding to the metasternals of the female are short and wide apart in the angles of the shield between coxae II and III, the fifth are in the midline of coxae III, the sixth just before the midline of coxae IV and the seventh just before the posterior edge of coxae IV (Trägårdh (loc. cit.) in his figure of *C. natalense* shows in the angle between coxae II and III two round pores, and speaks of the pair of setae between coxae III as "sternal setae IV". These setae are really setae V and it would appear that the setae IV (metasternal setae) were wanting in his material and only represented by their base and accompanying pore), the ventri-anal portion of the holoventral shield behind coxae IV with converging curved sides as in female and with four pairs of setae of which the posterior pair are behind the anus.

Gnathosoma—Tectum broadly tongue-shaped with rounded medially lightly indented apex. Chelicerae as figured, with teeth as in female, movable digit with spermatophore carrier and ciliated processes.

Legs—I 812μ long, antennaeform, II 684μ, III 673μ, IV 719μ, armature as in female.

Loc. and Hosts—The holotype female and allotype male and four females and ten males, paratypes, from pill-millipedes from Mt. Glorious, Queensland, 27th Nov., 1948 (coll. H.W.).

Other specimens from pill-millipedes, Mt. Glorious, Q., 20th May, 1951: 8 females, 1 male (coll. K. Webber); Springbrook, Q., 9th April, 1955: 1 female, 4 males (coll. E. N. Marks); Tambourine, Q., Feb., 1954: 4 females, 5 males (coll. E. H. Derrick).

Remarks—This new species differs from the genotype in the female sex in the setation of the dorsal shield and its non-crenulate edge, in the very much closer position of the third pair of sternal setae, in the shorter length of the sternal shield along the median line as compared to the maximum width (4·4 : 1 as against 3 : 1 in *natalense*), in the longer anterior lobes of the latigynial shields and in the setae on these shields being equidistant from the ends of the outer margins, and in the longer sternal setae III. It is more difficult to indicate differences in the male except perhaps the absence of crenulations on the edge of the dorsal shield. Beyond stating that leg I is antennaeform Trägårdh gives no details of the lengths of the legs.

In the short series of specimens from Tambourine 2 males show a certain variation in that the sternal setae III are much wider apart, 34μ, and the tectum is blunt at the apex and lightly indented much as in the male (see Fig. 1, E).

Cryptometasternum derricki sp. nov.

Text fig. 2, A-G

Female holotype — Shape ovoid, posteriorly tapering to a blunt point. Strongly chitinised and dark brown in colour. Length of idiosoma 1021μ, width 720μ.

Dorsum—Shield almost entirely covering body except for a narrow strip of cuticle from shoulders backwards separating it from the narrow marginal shields, with distinctly crenulate margins, with long setae to 98μ long as figured, between and slightly behind the anterior marginal pair of long setae is a single seta; surface reticulate, with numerous pores.

Venter—Tritosternum with ciliated base more or less hidden under the free blade of the sternal shield, with paired ciliated laciniae; sternal shield wider than long, anterior margin concave, and posterior lightly concave, length in median line 130μ, and width between postero-lateral angles 340μ, with three pairs of setae and two pairs of pores; sternal setae I wide apart at the anterior angles 84μ long and directed forwards, II behind these and slightly nearer to one another just posterior of line joining anterior edges of coxae II 78·5μ long, setae III 65·8μ long and 12μ apart, close to apex of posterior sternal margin; metasternal shields long and narrow lying between and partially covered by

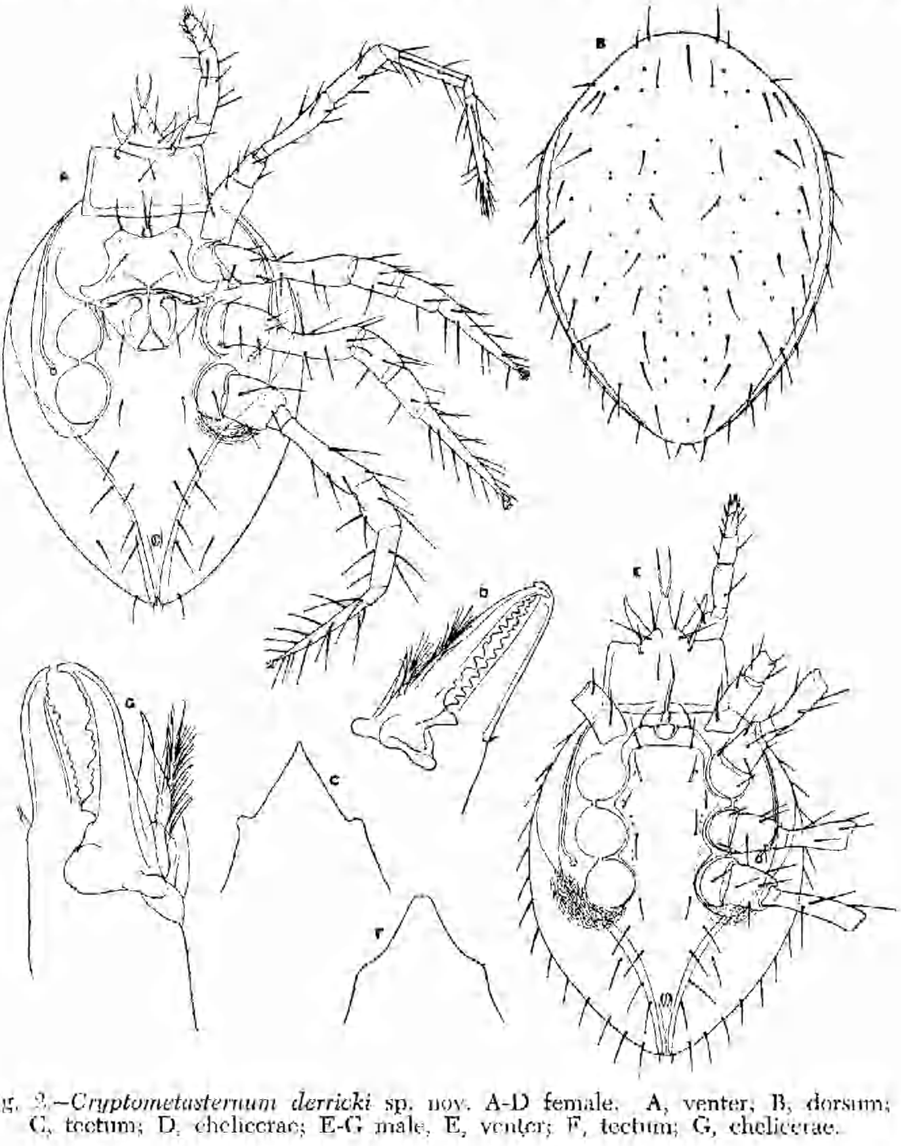

Fig. 2.—*Cryptometasternum derricki* sp. nov. A-D female. A, venter; B, dorsum; C, tectum; D, chelicerae; E-G male, E, venter; F, tectum; G, chelicerae.

the posterior margin of the sternal and the anterior margin of the latigynial shields, with short 28μ seta and pore; latigynial shields large and triangular, anterior margins with comparatively short anterior lobes, inner margins contiguous for two-thirds then diverging to enclose the small triangular mesogynial shield, with a pair of setae 78·5μ long on outer margin, 65·8μ apart and the anterior setae in the outer angles of the shield; with the usual claviform sclerites; mesogynial shield triangular, separated from the ventral by a narrow suture; ventral and anal shields coalesced to form a long, triangular shield reaching posterior end of body with incurved margins, separated from the latero-ventral shields by a thin strip of cuticle, uniting posterior of the anus, with four pairs of setae, the last pair posterior of the anus, in little depressed preparations the latero-ventral shields overlap the ventri-anal; stigma between coxae III and IV with long narrow peritremes reaching to coxae I, the peritremal and exopodal shields are coalesced as figured; all ventral shields are lightly but distinctly reticulated.

Gnathosoma—Tectum as figured, a pointed cone with distinct shoulders; chelicerae as figured and much as in other species; four pairs of hypostomal setae; in general as in *C. queenslandense*.

Legs—I longer than body, 1218μ, antennaeform, II 903μ, III 905μ, IV 1160μ, no special armature.

Male Allotype—Facies as in female. Length of idiosoma 928μ, width 660μ.

Dorsum—As in female.

Venter—Sternal, metasternal, latigynial, ventral and anal shields coalesced to form a single holoventral shield with a free anterior horizontal blade covering the genital orifice, with only eight pairs of setae as figured, the first sternal setae are 70μ long at the anterior angles, the second 65μ long directly behind these and just posterior of the blade in a line with the front edges of coxae II, the third pair 56μ long are directly behind these in a line with the middle of coxae II, the fourth or metasternal setae are wider apart, 33μ long and lie in the angle of the sternal shield between coxae II and III and they are accompanied by the usual small round pore, the fifth pair of setae lie in a line with the middle of coxae III and the sixth just behind the middle of coxae IV, on the long tapering ventri-anal portion are four pairs of setae as in the female.

Gnathosoma—Tectum as figured, a cone with blunt, slightly indented, narrow apex and fairly conspicuous shoulders (occasionally as in female); chelicerae as figured, movable digit with ? spermatophore carrier.

Legs—As in female, I 1218μ long, II 870μ, III 847μ, IV 1090μ.

Loc. and Hosts—The holotype female, allotype male, one paratype female and three paratype males from *Mastochilus australicus* (Passalidae) from Mt. Glorious, Queensland, 6th Feb., 1951 (coll. F. H. Derrick).

Another series of one female and five males from *Aulacocyclus edentulus* from a rotting Eucalypt log, Wilson's Downfall, N.S. Wales, 8th Oct., 1956 (G. F. Bornemissza); and a further series of fourteen females and sixteen males from Eucalypt log, Bell, Blue Mts., N.S.W., 27.11.56 (G.F.B.).

Remarks—This species is generally somewhat larger than *C. queenslandense* from which it differs in the body shape, the posterior end being rather pointed instead of round, in the first and fourth pairs of legs being distinctly longer than the idiosoma, in the sternum being deeper in the middle line compared with the greatest width, in the shorter latigynial lobes and in the position of the latigynial setae, and in general in the much larger dorsal and ventral setae. The edge of the dorsal shield is distinctly crenulate as figured by Trägårdh for *C. natalense*. The shape of the tectum shows considerable variation. In the series from *Aulacocyclus edentulus* from Wilson's Downfall, N.S.W.

the solitary female has a blunt apically indented tectum usually considered typical of the males, while of the five males two possess the typical form of tectum, the other three having a pointed cone-like tectum usually associated with the females of this group of mites.

Key to the three known species of *Cryptometasternum*.

1. Apex of body rather acute. Legs I and IV distinctly longer than idiosoma. Ratio of median length of sternum to its maximum width = 1 : 2·6. Sternal setae longer, margin of dorsal shield crenulate. Host, Passalidae.

C. derricki sp. nov.

Posterior edge of body rounded 2

2. Margin of dorsal shield crenulate. Ratio of median length of sternal shield to its greatest width = 1 : 3·2. Sternal and ventral setae relatively short, setae of latigynial shields nearer to angles than to one another. Legs? Host?

C. natalense Trägårdh 1950

Margin of dorsal shield not crenulate. Ratio of median length of sternal shield to its greatest width = 1 : 4·4. Sternal and ventral setae longer. Setae of latigynial shields equidistant from each other and from the angles. Legs I and IV about same length as idiosoma. Host, Pill-millipedes.

C. queenslandense sp. nov.

Genus DIPLOGYNIELLA Trägårdh, 1950

Trägårdh, I., 1950. Arkiv. f. Zool., Ser. 2, **1** (25), p. 388.

Type *D. levinseni* Träg., 1950.

This genus was diagnosed as follows: "Body elongate, oval, sternal hairs II and III of female placed in a transverse row behind the middle of the shield. Metasternal shields very narrow, band-shaped, fused in the middle with the sternal shield, further laterally separated from it through a fine line behind which the metasternal hairs are inserted. Lateral shields with well-developed, rounded anterior lobes, separated from the rest of the anterior margin by a deep incision. Male genital aperture completely concealed by the anterior edge of the sternal shield."

Type species *D. levinseni* n. sp.

From Trägårdh's description of *D. levinseni* from Venezuela (host not given) there are certain characters, especially in the male, which are probably generic although not included in the above diagnosis. First among these is the legs, of which I although antennaeform as in other genera of the Diplogyniidae are much shorter than the idiosoma, while III to IV are relatively stouter than usual. Secondly, may be noted the unusual character of the labial cornicles which are blunt and thumb-like, not a curved, pointed horn as in the female of *levinseni* and other genera. Further, there is not a clear strip of cuticle separating the ventri-anal shield from the latero-ventral shields. All these features occur in the unique male of the following new species, which on this account, but in the absence of the female is only provisionally placed in Trägårdh's *Diplogyniella*.

Diplogyniella gayi sp. nov.

Text fig. 3, A-F

Male Holotype—A fairly broadly oval, well chitinised brownish species. Length of idiosoma 986μ, width 780μ.

Dorsum—Dorsal shield as figured, almost entirely covering dorsum, with long to 7μ setae and numerous pores, apparently some of the setae lost from the specimen.

Venter—Tritosternum missing from specimen, probably normal; sternal, metasternal, latigynial, ventri-anal shields coalesced to form a single holo-ventral shield, with anterior horizontal blade deeply incised medially to accommodate the genital organs which are missing from the specimen, with six pairs of setae on anterior portion of which the fourth pair (metasternals) are widest apart and slightly behind the angle between coxae II and III, on ventri-anal portion with four pairs of setae the posterior pair behind the anus, the ventri-anal portion almost reaches tip of body and is only separated from the latero-ventral shields by a fine line, stigma between coxae III and IV with long, thin peritreme reaching to coxae I.

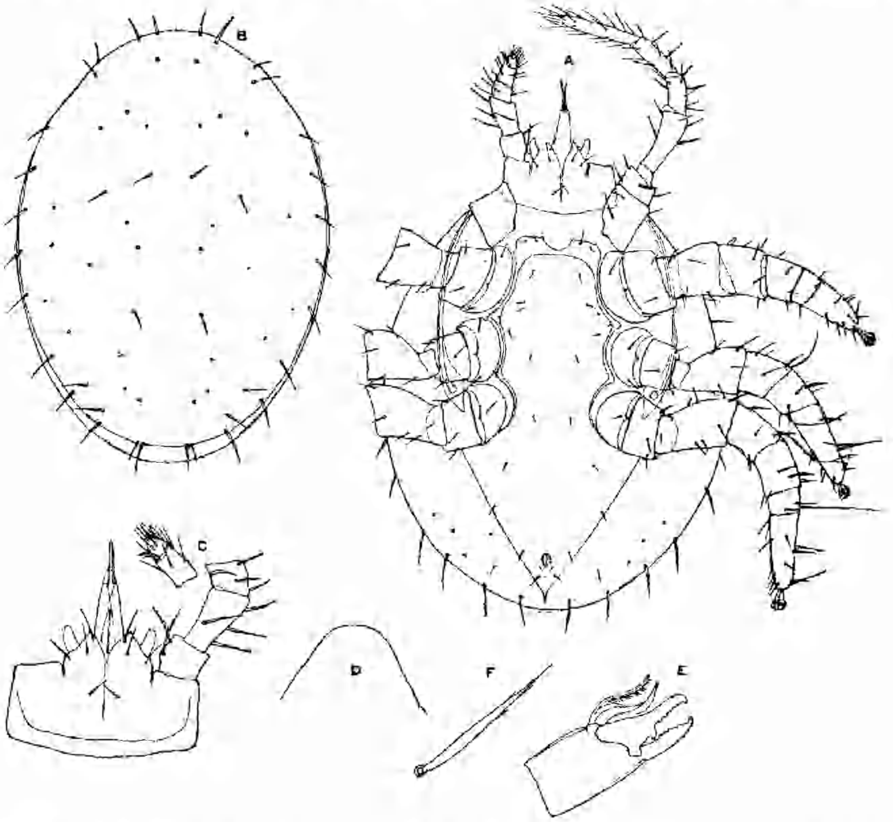

Fig. 3.—? *Diplogyniella gayi* sp. nov. Male A-F. A, venter; B, dorsum; C, gnathosoma; D, tectum; E, chelicerae; F, dorsal seta.

Gnathosoma—As figured, with the labial cornicles blunt and thumb-like as in *D. levinseni*, with four pairs of hypostomal setae; chelicerae as figured, short, with six to seven teeth on each digit, the basal tooth on movable digit large, movable digit with ciliated appendages and a strong, twisted process, which may be a spermatophore carrier.

Legs—All shorter than the idiosoma, IV being the longest, I short 696μ long and antennaeform, II 696μ long, strong and stout, III similar to II 754μ long, IV also similar 835μ long, all tarsi with short caruncle and indistinct paired claws, no especially strong spines on coxae on any legs.

Loc. and Host—The only specimen, a male from a Passalid from a rotten log Imbil, Queensland, 11th Sept., 1946 (coll. F. J. Gay).

Remarks—In the absence of the female this species is tentatively placed in Trägårdh's genus *Diplogyniella* on the male characters as outlined in the introductory discussion.

Genus PASSALACARUS Pearse *et al.*

Pearse, A. S., Patterson, M. T., Rankin, J. S., and Wharton, G. W., 1936: The Ecology of *Passalus cornutus* Fabr. a beetle which lives in rotting logs—Ecological Monog., 6, pp. 455-490.

This genus was somewhat inadequately described by Pearse and his collaborators from mites living commensally on the beetle *Passalus cornutus* Fabr. (fam. Passalidae) from rotting oak logs in the Duke Forest, Durham, N. Carolina. Type *P. sylvestris* Pearse *et al.* In 1950 Trägårdh in his important paper (loc. cit.) reported on his study of specimens sent to him by Dr. Wharton, and gave considerably greater details, showing that *Passalacarus* belonged to his family Diplogyniidae and that it was closely related to his genus *Cryptometasternum*. In a general discussion and a subsequent key to the genera of the Diplogyniinae Trägårdh outlined a number of generic characters from which the following diagnosis may be construed.

Diagnosis—Well chitinised, oval mites, with entire dorsal shield covering the whole body. Leg I antennaeform, without claws or caruncle. Sternal shield in both sexes with a horizontal free blade. In the female sternal shield shorter than wide with deeply excavate anterior and posterior margins, with three pairs of setae and two pairs of pores, setae I at the anterior angles, II lateral and just behind base of blade, III close together near apex of posterior margin, all long and strong. Metasternal shields narrow, lying between the sternal and latigynial shields, coalesced medially and with a long seta and pore, the setae are nearly as long as the sternal setae.

Latigynial shields triangular, with two long setae and the medial edges contiguous except where they diverge to expose the triangular mesogynial shield, which is not separated basally by a suture from the coalesced large triangular ventri-anal shield.

Passalacarus brooksi sp. nov.

Text fig. 4, A-F

Female Holotype—Shape oval, brownish and strongly chitinised. Length of idiosoma 754μ, width 580μ.

Dorsum—With a single entire dorsal shield, completely covering the body except for the posterior end where the rounded end leaves exposed a portion of the body as figured; the marginal shields are very narrow, only indistinctly seen and very narrowly separated from the edge of the dorsal shield which is not crenulate. Dorsal setae as figured, to 80μ long.

Venter—Tritosternum as figured; sternal shield wider than long, anterior margin excavate, posterior margin fused with the anterior margin of the metasternal shields, with three pairs of setae apart from the metasternal setae and two pairs of pores, setae I at the anterior angles of sternal shield 117μ long and 122μ apart, setae II 47μ long and only 94μ apart in a line a little behind anterior edges of coxae II, setae III very close together in median line and in line of postero-lateral corners of sternal shield; metasternal shields long and narrow with the anterior margin fused with posterior edge of sternal shield, each shield with a long seta 70μ, and accompanying pore; latigynial shields triangular with two setae 61μ long 47μ apart, the anterior setae in the anterior angle and the posterior about the middle of the sides, median edges contiguous for two-thirds of the length of shields where they diverge to accommodate the triangular mesogynial shield; sternal and latigynial shields with reticulations; mesogynial shield small, triangular, separated by a narrow suture from the ventri-anal shield; ventral and anal shields coalesced to form a large triangular shield with incurved tapering sides reaching tip of body, sides narrowly separated from latero-ventral shields by a thin strip of cuticle, with six pairs of long setae posterior of coxae IV. Stigma between coxae III and IV with a long, narrow peritreme reaching to coxae I, exopodal and peritremal shields coalesced.

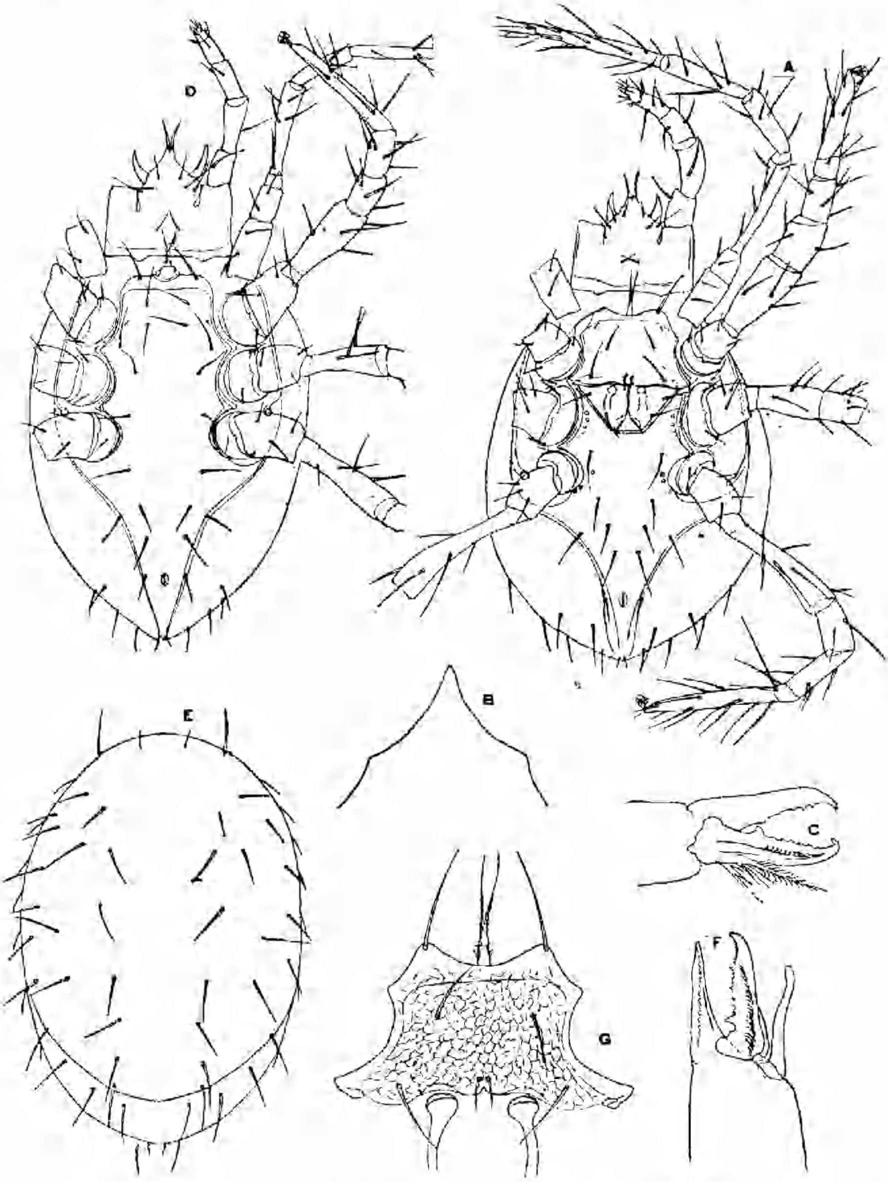

Fig. 4.—*Passalacarus brooksi* sp. nov. A-C, G, female. A, venter; B, tectum; C, chelicerae; G, sternal shield; D-F male, D, venter; E, dorsum; F, chelicerae.

Gnathosoma—Tectum a pointed cone with rather pronounced shoulders as figured; with four pairs of hypostomal setae; labial cornicles and other details as figured and similar to *Cryptometasternum*; chelicerae as figured.

Legs—I much longer than body, antennaeform, without caruncles or claws, to 1044μ long; II 812μ; III and IV ?.

Male Allotype—Facies as in female. Length of idiosoma 754μ, width 580μ.

Dorsum—As in female.

Venter—Sternal, metasternal, ventral and anal shields coalesced to form a single holoventral shield, with free horizontal anterior blade in a median cavity of which lies the genital orifice, with eleven pairs of long setae, setae I 94μ long and 108μ apart, II 75μ long and 84μ apart, III 56μ long and 108μ apart, metasternal setae 80μ long and 173μ apart, otherwise the venter as in female.

Gnathosoma—Similar to the female; tectum a pointed cone with shoulders as in female; chelicerae as figured, the movable digit with ciliated processes and a strong spermatophore carrier.

Legs—As in female, without special armature, I 1067μ long, II and III 812μ, IV 986μ.

Loc. and Hosts—The holotype female and allotype male and a paratype of both sexes from a Passalid beetle in rain forest, Julatten, N. Queensland, 23rd Oct, 1949 (coll. J. G. Brooks).

Remarks—This species is placed herewith in the genus *Passalacarus* as above diagnosed on the basis of the type species *P. sylvestris* Pearse *et al.* chiefly on the long metasternal setae in the female. Apart from specific differences, however, there are others in the female which might perhaps justify generic separation. These are firstly the complete fusion of the metasternal shields with the sternal shield along their anterior margins, and secondly, the separation by a distinct suture of the small mesogynial shield from the ventrianal shield. However, for the present the species is placed in *Passalacarus* after comparison not only with the original description of Pearse and Wharton and the subsequent study by Trägårdh, but also with a number of specimens collected by myself, while in company with Dr. A. B. Gurney of the U.S. National Museum from *Passalus cornutus* Fabr. (= *Popilius disjunctus* Illiger) in a rotten log at Annapolis, Ma., U.S.A., June, 1947.

Genus MONODIPLOGYNIUM nov.

Broadly oval with entire dorsal shield covering the whole idiosoma, furnished with long, tapering setae. In both sexes sternum with a free horizontal blade. In the female sternum wider than long in median line, with concave posterior and anterior margins, with three pairs of long setae and two pairs of pores, sternal setae III wide apart and just anterior of posterior border; metasternal shields long and narrow, lying between but not coalesced with sternal or latigynial shields, with fairly long seta and pore; latigynial shields large and triangular, with only a single long seta placed near outer margin, mesogynial shield small, triangular and separated from ventri-anal by a suture; ventral and anal shields coalesced and triangular behind coxae IV; tectum a sharp, triangular cone; chelicerae with many teeth on both digits, and hyaline ciliated processes on movable digit. Legs I and IV longer than idiosoma, I antennaeform without caruncle or claws. In male, facies generally as in female; all ventral shields coalesced except the lateral, sternal part with six pairs of setae, of which the metasternals are widest apart; chelicerae with a fairly long ? spermatophore carrier besides the ciliated processes on movable digit.

Type *M. carabi* sp. nov.

Monodiplogynium carabi sp. nov.

Text fig. 5, A-H

Female Holotype—A well chitinised brownish mite of oval shape; length of idiosoma 893μ, width 672μ.

Dorsum—With entire dorsal shield only leaving a small area at the posterior end uncovered, furnished with long, pointed setae and many pores as figured.

Venter—Tritosternum with ciliated base and pair of ciliated lacinia; sternal shield with rather strongly concave anterior margin, wider than long in the median line, 99μ by 282μ, with three pairs of long setae and two pairs of pores, setae I at the anterior angles 70μ long and 117μ apart, setae II about in line

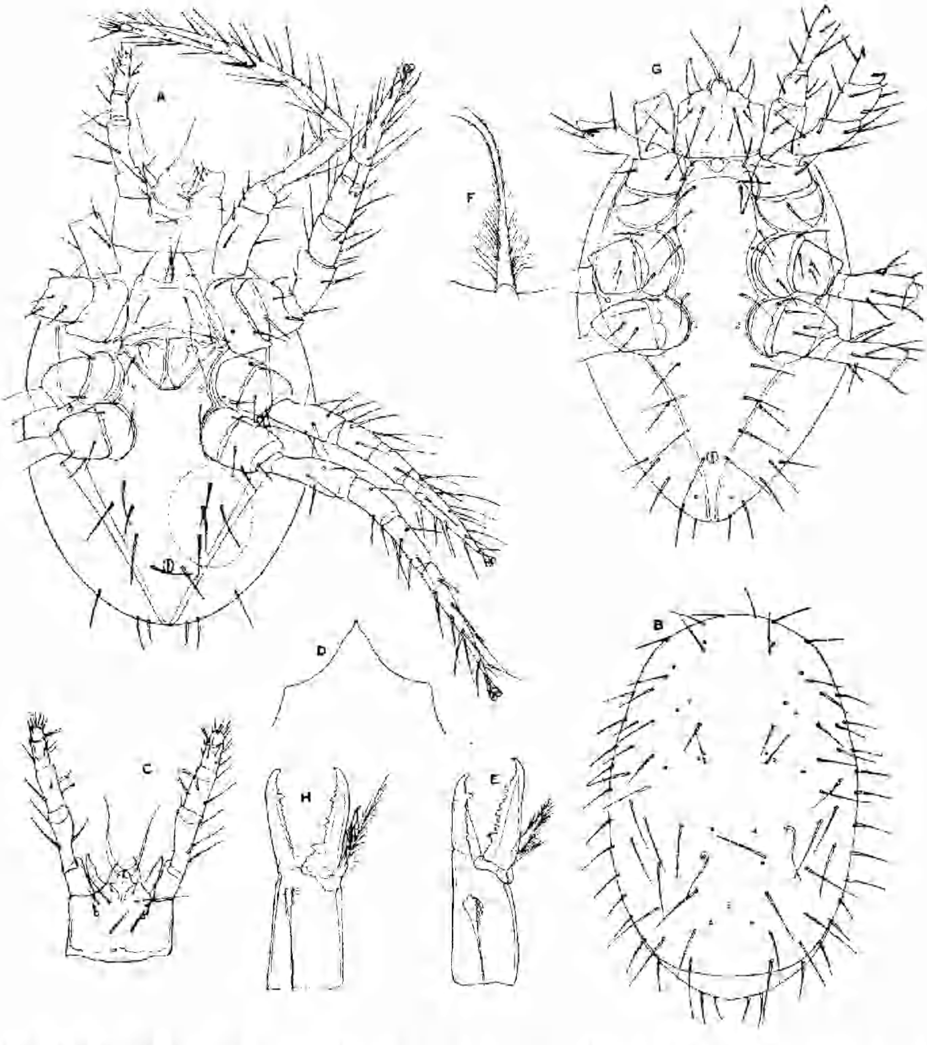

Fig. 5.—*Monodiplogynium carabi* g. et sp. nov. A-F female. A, venter; B, dorsum; C, gnathosoma; D, tectum; E, chelicerae; F, tritosternum; C-H male, G, venter; H, chelicerae.

with the anterior third of coxae II 61μ long and 84μ apart, setae III about in line with the posterior third of coxae II 61μ long, 112μ apart; metasternal shields long and narrow lying between but not coalesced with the posterior margin of the sternal and the anterior margins of the latigynial shields with setae 61μ long; latigynial shields triangular not much longer than wide, with scarcely any anterior lobes, their inner margins contiguous for three-fourths their length when they diverge to enclose the small triangular mesogynial shield, each shield with only one seta 70μ long, placed near the outer margin at one-third from anterior end; mesogynial shield small and triangular separated from the ventri-anal shield by a distinct suture; ventral and anal shields coalesced as a large triangular shield reaching to the posterior margin with almost straight sides, separated from the latero-ventral shields by a narrow strip of cuticle, with five pairs of long setae, the posterior pair of which are about in line with the anus; stigma between coxae III and IV with long, thin peritreme extending to coxae I.

Gnathosoma—As in *Cryptometasternum* and other genera; tectum a pointed cone with prominent shoulders; chelicerae as figured, fixed finger with strong subapical tooth and many smaller teeth, movable digit with three strong teeth interspersed with smaller teeth, the basal tooth the largest, with hyaline ciliated processes.

Legs—I longer than idiosoma, 1044μ, and antennaeform without claws or caruncle, II and III stouter 812μ, IV 986μ without any special armature.

Male Allotype—General facies as in female. Length of idiosoma 928μ, width 626μ.

Dorsum—As in female.

Venter—Sternal, metasternal, latigynial, ventral and anal shields coalesced to form a single holoventral shield, anteriorly with a horizontal blade covering the genital orifice, with six pairs of long setae, of which the first sternal setae are wide apart at the anterior angles, second similar and just behind posterior margin of blade, third about in line with middle of coxae II, fourth or metasternal setae widest apart in the angle of shield between coxae II and III and accompanied by a small, round pore, posterior of coxae IV with five pairs of setae of which the posterior pair lie in line with the middle of the anus; ventri-anal portion triangular with rather concave sides as figured.

Gnathosoma—Generally as in female; tectum similar; chelicerae similar to the female but movable finger with a curved and twisted spermatophore carrier.

Legs—As in female, I 1033μ long, II and III 824μ, IV 1010μ.

Loc. and Hosts—The holotype female and allotype male, 5 paratype females and 3 paratype males from a small Carabid beetle from under a log at Aiyura, N. Guinea, at 5000ft., July, 1954 (coll. H.W.).

GENUS PARADIPLOGYNIUM nov.

Broadly oval shape with entire dorsal shield covering the whole body, the shield with long marginal setae and very short dorsal setae. In female sternal shield with free horizontal blade, wider than long, with sternal setae I and II stout and closely adjacent in the antero lateral angles, setae III close together in median line and near to apex of concave posterior sternal margin. Metasternal shields long and narrow, inserted between the posterior margin of the sternal and anterior margin of the latigynial shields with a short metasternal seta and pore. Latigynial shields triangular with two short setae, the anterior placed near inner margins, posterior in the middle of the shields. Mesogynial shield small and triangular, separated from the coalesced ventri-anal shield. Anal shield pear-shaped and coalesced within the ventral shield, its shape indicated by a fine line. Ventri-anal shield broadly triangular, reaching apex of body with outwardly curved sides and fine, short setae. Legs not longer than body, I antennaeform without claws or caruncle. Male with similar facies to female, sternal setae I, II and III all close together in the anterior angles of sternal shield.

Type *Paradiplogynium panesthia* sp. nov.

Paradiplogynium panesthia sp. nov.

Text fig. 6, A-F

Female Holotype—A rather small, well chitinised, brownish species of oval shape. Length of idiosoma 696μ, width 545μ.

Dorsum—Dorsal shield entirely covering the whole of the dorsum. Lateral margins with six long setae, anterior with a pair of long setae wide apart, flanked by shorter setae and on the shoulders another short seta, posteriorly with a pair of long setae 141μ, wide apart and in between these two pairs of shorter setae of which the inner are the shorter, discally the dorsal shield is furnished with very short setae and many pores.

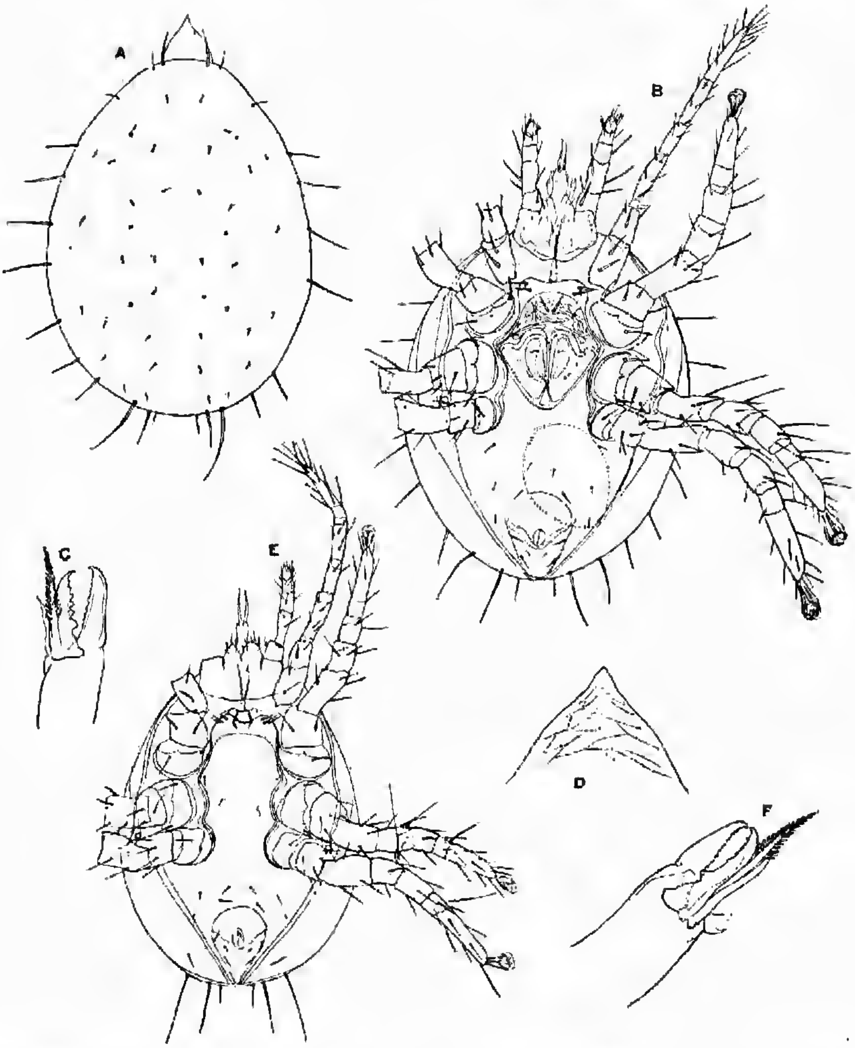

Fig. 6.—*Paradiplogynium panesthia* g. et sp. nov. A-D female. A, dorsum; B, venter; C, chelicerae; D, tectum; E-F male, E, venter; F, chelicerae.

Venter—Tritosternum with fairly long ciliated basal piece and a pair of ciliated laciniae, sternal shield wider than long with lightly concave anterior margin and more deeply excavate posterior margin, length of sternal shield in median line 70μ, greatest width 210μ, with strong anterior blade, with three pairs of setae and two pairs of pores, the setae strong and spine-like and all 28μ long, setae I and II close together but I behind II and situated in the antero-lateral angles of the shield and on the blade, III close together 14μ apart near apex of posterior border and 52μ behind setae II; metasternal shield free, long and narrow, and lying between borders of sternal and latigynial shields, with seta 19μ and accompanying pore; latigynial shields triangular, with long anterior lobes, each shield longer than wide, 143μ by 93·5μ, with the inner margins contiguous for three-fourths of their length when they diverge to enclose the small triangular mesogynial shield, each shield with two short setae 19μ long, the anterior inserted near to the inner margin and about level with the outer angles, the posterior about midway between the inner and outer margins; mesogynial shield small, triangular and separated from the ventri-anal by a distinct suture; the ventral shield broad behind coxae IV, with convex margins converging to the apex of the body, although the anal shield is not entirely coalesced with the ventral shield it is embraced within it and clearly defined as figured, the margins of the ventral shield are separated from the latero-ventral shields by a narrow strip of cuticle, excluding the anal the ventral bears 5 pairs of short setae; anal shield pear-shaped, and as stated embraced within the ventral shield, 122μ wide by 169μ long, with two pairs of setae and a pair of pores; stigma between coxae III and IV with long, narrow peritreme extending to coxae I and the peritremal and exopodal shields coalesced.

Gnathosoma—Generally as in other genera of the Diplogyniidae with four pairs of hypostomal setae; tectum a sharp conical shape as figured; chelicerae with many teeth on both digits, movable digit with basal tooth large, and with a long, tapering hyaline process with clavate ciliations.

Legs—Relatively short, none longer than body, I antennaeform 580μ, II and III 533μ, IV 580μ, no specialised setae on legs or coxae, II-IV with short caruncles and paired claws.

Male Allotype — General facies as in female. Length of idiosoma 730μ, width 545μ.

Dorsum—As in female.

Venter—Sternal, metasternal and ventral shields coalesced, the holoventral shield with a strong anterior horizontal free blade, which covers the genital orifice, sternal setae I, II and III short and strong, spine-like and clustered together in the antero-lateral angles; metasternal setae short and placed in the angles of the shield between coxae II and III; anal shield as in the female.

Gnathosoma—Tectum rather short and a conical triangle; chelicerae with many teeth on each digit, the basal tooth on fixed digit large, fixed digit with spermatophore carrier and a long hyaline tapering process with clavate ciliations; four pairs of hypostomal setae.

Legs—I 564μ long, II 512μ, III 530μ, IV 611μ, otherwise as in female.

Loc. and Hosts — The holotype female and allotype male, two paratype females and four paratype males from a species of cockroach, *Panesthia laevicollis* Sauss. from a rotten Eucalyptus log, Porter's Retreat ca. 60 miles from Jenolan Caves, N.S. Wales, 26th Nov., 1956 (G. F. Bornemissza).

Seventeen other specimens, ten males and seven females from the same host, from Eucalypt log, Hampton, Queensland, 3rd Oct. (G.F.B.) One female and two males also from a Blattid from Dalby Banga, Q., 25th Dec., 1925 (H. Geary).

Remarks — The chief features of this genus are the clustered position of sternal setae I and II in the female and I, II and III in the male, in the antero-lateral sternal angles, and the clearly defined anal shield embraced within the posterior end of the ventral shield. Its affinities with other genera of the family Diplogyniidae are shown in the new key.

Key to the subfamilies of the *Diplogyniidae* (after Trägårdh).

1. Anal shield of female separated from the ventral shield. Subfam. *Neodiplogyniinae.*

Anal shield of female not separated from ventral shield. 2

2. A narrow band with minute spinulae round the margin. Subfam. *Heterodiplogyniinae.*

No such band. 3

3. Dorsum densely clothed with minute hairs. Subfam. *Trichodiplogyniinae.*

Dorsum not so. 4

4. Dorsal shield with a row of hook-shaped bristles. Subfam. *Meinertulinae.*

Dorsal shield without such bristles, Subfam. *Diplogyniinae.*

Key to the Genera of the *Diplogyniinae*
(after Trägårdh and based on females).

1. Three pairs of setae on the latigynial shields. *Tridiplogynium* Träg.

Two pairs of setae on the latigynial shields 2

One pair of setae on the latigynial shields. *Monodiplogynium* nov.

2. Only one pair of sternal setae. *Diplogyniopsis* Träg.

With three pairs of sternal setae 3

3. Sternal setae III very close together and near apex of posterior border of scutum 4

Sternal setae III otherwise 5

4. Metasternal setae long, as long as or almost as long as sternal setae III. *Passalacarus* Pearse *et al.*

Metasternal setae very short. *Cryptometasternum* Träg.

5. Both sternal setae II and III near the strongly concave posterior border but both wide apart and posterior of the apex. *Lobogynium* Träg.

Sternal setae II and III not so placed 6

6. Sternal setae II and III in a transverse row. *Diplogyniella* Träg.

Not so 7

7. Sternal setae short, III wide apart but near to posterior border and in line with its apex and well behind setae II. *Lobogynioides* Träg.

Sternal setae otherwise 8

8. Metasternal shields fused so that sternum bears four pairs of long setae, both III and IV being behind apex of posterior border. *Brachysternum* Träg.

Metasternal shields free, setae II and IV short and in same transverse line level with apex of posterior border. *Schizodiplogynium* Träg.